

Fish and Wildlife Harvesting

**Programmatic Biological Evaluation
Fish and Wildlife Harvesting
Version: 13 October 2000**

1. Summary of Activity:

a. In all Fresh Waters *excluding* the Columbia River mainstem: No work is authorized under this programmatic biological evaluation in fresh waters.

b. In the Columbia River mainstem *including* Snake River and Baker Bay: Placement of crab or shrimp pots, non-commercial clam digging, and non-commercial oyster and mussel harvesting provided that: work only occurs in estuarine portions of the Columbia River (Baker Bay), and no clam digging or oyster and mussel harvesting activities occur over or adjacent to vegetated shallows. [from NWP 4]

c. In all Marine/Estuarine Waters *excluding* Baker Bay: Placement of crab or shrimp pots, non-commercial clam digging, and non-commercial oyster and mussel harvesting, provided that: no clam digging or oyster and mussel harvesting activities occur over or adjacent to vegetated shallows. [from NWP 4]

2. Programmatic Description: Individual permits (IPs), letters of permission (LOPs) and Nationwide Permit 4 (NWP 4) may authorize the placement of crab and shrimp pots or clam digging and oyster and mussel harvesting. This programmatic biological evaluation applies only to the placement of crab and shrimp pots (commercial and non-commercial), non-commercial clam digging, and non-commercial oyster and mussel harvesting. Work that cannot be designed or constructed to fit under this biological evaluation must go through individual informal or formal ESA consultation.

3. Project Location: In all marine/estuarine waters only in the counties of Washington State where the National Marine Fisheries Service and U.S. Fish and Wildlife Service have concurred that the project is not likely to adversely affect listed fish species and designated critical habitat and will not jeopardize proposed fish species or destroy or adversely modify proposed critical habitat.

4. Project Description: This programmatic biological evaluation does not cover any interrelated and/or interdependent work activities in any of the designated critical habitat areas, except those activities distinctly specified.

a. Placement of crab pots - Non-commercial harvesting: Non-commercial crab harvesting may be done with the use of "crab pots", "ring nets", "star traps", by hand with "dip nets" or with scuba gear. Crab harvesting occurs at a depth of 10 to 60 feet at high water, accessing the area by boat, or from an existing in-water structure such as a pier or float (sometimes by beach if at low water). Pots, nets, or traps are weighted down and placed on the substrate with a weighted rope and buoy marking the location. For most crab harvesters, the pot is placed in the

morning and retrieved in the evening. For crab harvesters living on the shoreline, pots are more likely to be left out for 1 to 2 days. The pots are drawn in either by hand or by use of an electric wench (WDFW, 1999a).

b. Placement of shrimp pots - Non-commercial harvesting: Non-commercial shrimp harvesting is done with the use of “shrimp pots”. Depending on the target species, shrimp harvesting usually occurs at a depth of 250 to 400 feet. Coonstripe dock shrimp are harvested near existing in-water structures such as piers or floats. The pots are weighted down and placed on the substrate by boat with a weighted rope and buoy marking the location. Pots are typically placed out for one day only. The pots are drawn in either by hand or by use of an electric wench. (WDFW, 1999a.)

c. Placement of crab pots - Commercial Harvesting: WDFW requires that each pot have it's own buoy. The buoy design is regulated by WDFW – closed cell Styrofoam buoy averaging 2 feet in diameter. For larger vessels, the vessel is either rigged to drop the pot, feed the line and place the buoy. For smaller vessels, pots are usually tossed in the water by hand. Pots are partially submerged in the water before dropped to ensure better placement on the floor. At the beginning of the season when crab are more abundant, pots are usually left in only for one day – placing the pot in the morning and retrieving it at night. At the end of the season when abundance is less, pots are usually left in the water for 5 to 7 days.

d. Placement of shrimp pots - Commercial Harvesting: WDFW allows up to 20 pots per 2 buoys, with one buoy placed on either end of the line of pots. The buoy design is regulated by WDFW – closed cell Styrofoam buoy averaging 2 feet in diameter. For larger vessels, the vessel is rigged to drop the pot, feed the line and place the buoy. For smaller vessels, pots are usually tossed in the water by hand. Pots are partially submerged in the water before dropped to ensure better placement on the floor. Shrimp harvesting is strictly regulated by WDFW with a very short shrimping season. Pots are placed left in only for one day – placing the pot in the morning and retrieving it at night. Trawling is often the method of commercial shrimp harvesting. However, trawling is not regulated by the Corps and not covered under this programmatic biological evaluation.

e. Clam digging - Non-commercial: For non-commercial clamming, all digging is done by hand or with hand operated equipment. The harvester accesses the beach from an upland point or from a boat; determines the location of the clam by evidence of “clam show” – a dimple, doughnut or keyhole depression in the sand; then proceeds to dig around the depression 6 to 10 inches below the surface to uncover the clam. (WDFW, 1999b.)

f. Oyster and mussel harvesting - Non-commercial: For non-commercial oyster and mussel harvesting, the oyster or mussel beach is accessed from an upland access point or from a boat. The work is done by hand, prying off the oysters or

mussels from rock areas on the beach with a wedge or knife. On privately owned tidelands, the property owner is allowed to harvest a larger quantity than in public areas where a shellfish harvesting permit is required. In these areas, the property owner may use a “rake” to rake the beach.

5. Project Construction/Operation Description:¹

a. Placement of crab pots - Non-Commercial:

1. Equipment used: For non-commercial harvesting, crab pots, ring nets or star traps. Crab pots are typically 3 feet in diameter and 8 inches high. The pots are collapsible and made of durable material, usually metal mesh coated with plastic. A buoy and rope and weight are used to anchor and mark the pot. The buoy must be constructed of durable material (close cell Styrofoam with plastic coating to ensure no water leakage). WDFW does not allow bleach, antifreeze, or detergent bottles, paint cans, etc. Pots must have escape holes for smaller crabs. The mesh and design of the traps allows both juvenile and adult fish to pass through the pot unhindered.

2. Access: Access is by boat. Recreational boat size may vary but is an average length of 17 to 25 feet. Occasionally crab harvesting will be done by hand, accessing an area from an upland location and wading into the waters, catching the crab by hand, using scuba equipment or with dip nets. Hand harvesting with scuba equipment or dip nets is not a Corps regulated activity. Harvesting typically occurs in sandy substrates at deep water. However, harvesting may also occur at low tide in sandy or muddy bays near eelgrass beds. (Kozloff, 1993.)

3. Limits: Restricted by WDFW, a total of 2 crab pots (or 2 units of gear) are allowed per person. Catch limits vary by species and location. For Dungeness Crab, 12 males per day are allowed in the Columbia River with a minimum size of 5 ¾ inches, and 6 males per day allowed in the rest of Washington state with a minimum size of 6 inches (For Puget Sound excluding Hood Canal the minimum size is 6 ¼ inches). Six crab (male or female) with a minimum size of 5 inches is allowed for Red Rock crab through out Washington State. The Columbia River and Pacific Ocean Dungeness Crab harvesting is allowed only from 1 December through 15 September. Puget Sound and Hood Canal Dungeness Crab harvesting is allowed only from 16 July through 15 April. Red Rock crab may be harvested anywhere in Washington State from 1 December through 15 September.

4. Retrieval and Clean-up: Restricted by WDFW, crab pots or other crab catchment devices are not allowed to be left in the water overnight from one hour

¹ Information on the operation of non-commercial and commercial shellfish harvesting was obtained by personal communication with Norm Lemberg, Crab Manager, WDFW, on February 23, 2000.

after sunset to one hour before sunrise. Exception to this is when the crab harvester is a shoreline owner and crabbing directly waterward of their property. In this case, pots are often left for 1 to 2 days. Pots are retrieved either by hand or by electric wench from the boat. Any remaining bait (typically salmon carcasses or heads) is dumped back into the water.

b. Placement of shrimp pots - Non-Commercial:

1. Equipment used: For non-commercial shrimp harvesting, the “shrimp pot” is restricted by WDFW to a size of 10 feet in perimeter with a maximum height of 18 inches, and a mesh no larger than 7/8 of an inch. The pots are made of durable material, usually metal mesh coated with plastic. A buoy and rope and weight are used to anchor and mark the pot. The buoy must be constructed of durable material (close cell Styrofoam with plastic coating to ensure no water leakage). WDFW does not allow bleach, antifreeze, or detergent bottles, paint cans, etc. The mesh and design of the traps allows both juvenile and adult fish to pass through the pot unhindered.

2. Access: Access is by boat or from an existing in-water structure such as a pier or float. Recreational boat size may vary but is an average length of 17 to 25 feet. The substrate varies depending on the target species. Coonstripe dock shrimp prefer sand or gravel bottoms near existing structures. Humpback or spot shrimp prefer sandy or mud substrates with a rapid tidal current flow. Prawns prefer rocky crevices. (Fisheries and Oceans, Canada, 2000)

3. Limits: Restricted by WDFW, harvesting limits vary by location and species harvested. For Hood Canal, recreational harvesters are allowed only one shrimp pot per person. In the rest of Puget Sound, up to two shrimp pots per person are allowed. For all of Puget Sound, excluding Hood Canal, 10 pounds of shrimp (including heads and tails) are allowed. Hood Canal has the daily limit of 80 shrimp total. Shrimping is allowed for 2 days a year through most of Washington. Hood Canal shrimping season varies based on estimated shrimp population, with the shortest season at one day per year and the longest at 6 days per year.

4. Retrieval and Clean-up: Restricted by WDFW, shrimp pots are not allowed to be left in the water overnight from one hour after sunset to one hour before sunrise. Pots are retrieved either by hand or by electric wench from the boat. When shrimp are cleaned (de-headed), the heads are typically dumped back into the water along with any remaining bait (typically wet cat food).

c. Placement of crab pots - Commercial Harvesting:

1. Equipment used: The vessels used for commercial crab harvest range from 17 to 45 feet in length; crab pots are 2 ½ - to 3-feet in diameter and 1 foot in height; 100 to 300 pots per vessel; for each pot there is a weighted nylon rope and a buoy averaging 2 feet in diameter. Pots must have escape holes for

smaller crabs. The mesh and design of the traps allows both juvenile and adult fish to pass through the pot unhindered.

2. Access: The crab pots are placed at a depth of 20 to 300 feet depending on species and time of year. Harvesting typically occurs in sandy substrates at deep water. However, harvesting may also occur at low tide in sandy or muddy bays near eelgrass beds. (Kozloff, 1993.) The area is accessed by a 17- to 45-foot vessel. Non-tribal harvesters typically use the larger vessels whereas tribal harvesters typically use the smaller vessels.

3. Limits: Each license is limited to 100 pots. There is typically 3 licenses per vessel, especially for non-tribal harvesters, averaging 300 pots per vessel.

4. Retrieval and Clean-up: Pots are retrieved by an electric wench. Left over bait (typically salmon carcasses or heads) is usually tossed over board after the pot is retrieved.

d. Placement of Shrimp Pots – Commercial:

1. Equipment used: The vessel is usually 17- to 35- feet in length, the pots are 2 ½ to 3-feet in diameter and of collapsible construction. Each vessel carries 100 to 300 pots (100 pots per license). The pots are placed with a weighted nylon rope and average 2 buoys per 10 to 20 pots. Buoys average 2 feet in diameter. The mesh and design of the traps allows both juvenile and adult fish to pass through the pot unhindered. Often commercial shrimp harvesting is done by trawling. However, trawling is not regulated by the Corps and is therefore not covered under this programmatic biological evaluation.

2. Access: The shrimp pots are placed at a depth of 250 to 400 feet depending on species and time of year. The area is accessed by a 17- to 35-foot vessel. Non-tribal harvesters typically use the larger vessels where as tribal harvesters typically use the smaller vessels. The substrate varies depending on the target species. Coonstripe dock shrimp prefer sand or gravel bottoms near existing structures. Humpback or spot shrimp prefer sandy or mud substrates with a rapid tidal current flow. Prawns prefer rocky crevices. (Fisheries and Oceans, Canada, 2000)

3. Limits: Each license is limited to 100 pots. There is typically 3 licenses per vessel, especially for non-tribal harvesters, averaging 300 pots per vessel.

4. Retrieval and Clean-up: Pots are retrieved by an electric wench. Left over bait (typically some sort of decaying bait, i.e. cat food, invertebrates or small fish) is usually tossed over board after the pot is retrieved.

e. Clam Digging – Non-Commercial:

1. Equipment used: For non-commercial clam digging, harvesters use either a clam shovel (a shovel with 15 inch blade) or a clam tube (a 4-inch diameter circular can or tube or a 4-inch long, 3-inch wide elliptical can or tube). All work is done by hand. Non-commercial clambers may not use hydraulic or other machinery to harvest geoducks or other clams.
2. Access: Depending on the location of the beach, the tidal area is accessed either from an upland beach access point or from a boat.
3. Limits: Restricted by WDFW, clam harvesting limits are set at daily levels. Depending on location and species, the clam harvesting limits may be anywhere from 3 (geoducks) to 15 (razor clams) a day. The harvesting permits are limited so that the harvest must keep the first of the limit caught – i.e. the first 3 geoducks caught.
4. Work area: Harvest typically occurs in sandy substrates at low water (in the dry). (Kozloff, 1993) For each clam, the harvester digs 6 to 10 inches below the surface. If using a “clam tube”, the hole is approximately 4 inches in diameter. If using a “clam shovel”, the hole is likely to be 12 inches in diameter and is dug from the dune side towards the waterline. For a successful harvester, holes dug must match the limit. However, most recreational harvester are not so successful, and may dig as many as three times the amount of holes as the limit.
5. Clean-up: With the harvesting permit, Washington Department of Fish and Wildlife requires that all holes dug be refilled with the original sediments immediately after the clam is harvested.

f. Oyster and Mussel Harvesting – Non-Commerical:

1. Equipment used: For non-commercial oyster and mussel harvesting, usually a wedge or knife is used to prior the oyster or mussel off. If a rake is used on privately owned tidelands, the rake is a heavy squared garden rake (tongs averaging 4 inches long) or may be a squared rake with longer tongs (averaging 6 to 8 inches long). In some cases, mussels are harvested off of ropes or tree branches dangling in the waters. All work is done by hand.
2. Access: Depending on the location of the beach, the tidal area is accessed either from an upland beach access point or from a boat.
3. Limits: Restricted by WDFW, mussels are restricted to harvesting 10 lbs of shell per license per day. For mussels, year round harvesting is allowed in Puget Sound and harvesting is restricted to November 1 through March 31 for Pacific Ocean beaches. For oysters, harvesters are restricted to 18 oysters total. In Puget Sound, harvesting may occur year round. Oyster size is restricted to a

minimum of 2 ½ inches. In Hood Canal, there is no size or time restriction but oyster shells must be shucked and left on the beach. There may be health restrictions of harvesting mussels and oysters on certain beaches during certain times of the year.

4. Work area: Harvesting typically occurs in cobble mixed with sand substrates at low water, which may have a scattering of rocks. (Kozloff, 1993) If pried by hand with a wedge or knife, the work area is the area of the oyster or mussel being harvested. If raked, the work area is usually the length of the private tideland owner's property in the intertidal areas when exposed during low tide.

5. Clean-up: On non-privately owned tidelands where harvesting is controlled by WDFW, oysters, mussels and their shells are removed from the site, except for oysters in Hood Canal where the shells must remain on the beach. On privately owned tidelands, if the harvester rakes, the oysters or mussels are removed from the beach. Some tideland owners will rake the beach back, filling in disturbed areas but most leave the sediment turned over to be redistributed by the incoming tides.

6. Action Area Description: The action area is for activities in all marine/estuarine waters of Washington State. There is no interrelated and/or interdependent work in any upland or wetland areas designated as critical habitat.

a. Placement of crab or shrimp pots - Non-Commercial Harvesting: The action area for non-commercial harvesting includes the vessel, the pot or pots placed and a radius of 25 feet² around the pots for potential temporary water quality impacts. All the pots placed by a single harvester in one day are included.

b. Placement of crab and shrimp pots - Commercial Harvesting: The action area for commercial harvesting includes the vessel, the pots or pots placed and a radius of 25 feet² around the pots for potential temporary water quality impacts. All the pots placed by a single vessel in one day are included.

c. Clam Digging – Non-Commercial: The action area for the non-commercial clam digging is the 12-inch diameter hole dug to capture the clams. All the holes dug by a single clammer in one day (average of 25 holes) are included over the full extent of the beach being harvested (averaging a third of an acre of beach).

² The determination of impact area for potential water quality impacts is based on personal communication with John Malek, Sediment Management, Environmental Protection Agency, on May 10, 2000. Mr. Malek stated that typically turbidity impacts of a pile driving, anchor placement or the like would not exceed a 15-foot radius, a 25-foot radius is the maximum extent of impact, regardless of substrate type and currents at a project site.

d. Oyster and mussel harvesting – Non-Commercial: The action area for non-commercial oyster and mussel harvesting on public beaches is the location of where the oyster or mussel is pried from the rock. On privately owned beaches where the area is raked, the action area is the entire area of the beach harvested by a single harvester in one day plus extending 25 feet waterward from the furthest waterward extent of the harvesting for temporary water quality impacts.

7. Species and Habitat Information:

a. Species Present:³

1. For the Columbia River Species mainstem in Washington State, *including* Snake River and Baker Bay: Snake River sockeye salmon (*Oncorhynchus nerka*)- status endangered; Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*) - status threatened; Snake River fall chinook salmon (*Oncorhynchus tshawytscha*) - status threatened; Snake River steelhead (*Oncorhynchus mykiss*) - status threatened, Columbia River chum (*Oncorhynchus keta*) - status threatened, Columbia River bull trout (*Salvelinus confluentus*) - status threatened, Lower Columbia River steelhead (*Oncorhynchus mykiss*) - status threatened, Lower Columbia River chinook (*Oncorhynchus tshawytscha*) - status threatened, Middle Columbia River steelhead (*Oncorhynchus mykiss*) - status threatened, Upper Columbia River steelhead (*Oncorhynchus mykiss*) - status endangered, Upper Columbia spring chinook (*Oncorhynchus tshawytscha*) - status endangered, and the southwest Washington coastal cutthroat trout, proposed for listing as threatened. This programmatic biological evaluation addresses only actions that occur in the estuarine portions of the Columbia River.

2. For all Marine/Estuarine Waters in Washington State, *excluding* Baker Bay: Puget Sound chinook salmon, status threatened (designated critical habitat), Hood Canal chum salmon, status threatened (designated critical habitat), Coastal/Puget Sound bull trout, status threatened, Ozette Lake sockeye salmon, status threatened (designated critical habitat), SW Washington/Columbia River/Coastal cutthroat trout, proposed threatened, and, Puget Sound coho salmon, candidate species.

b. Species Utilization: Refer to Appendix B - Species Life Histories.

8. Activity History and Status: The following table is a breakdown of the number of Nationwide Permit 4 (NWP 4 – Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities) verifications authorized by the Corps of Engineers. The breakdown is organized by year and waterbody.

³ Other listed or proposed plants or animals may occur in the project area. However, this document addresses only listed or proposed fish species. Review of impacts to other listed or proposed species will be done on a case-by-case basis.

The waterbody includes all creeks, streams, and unnamed tributaries that flow into it unless otherwise noted. Each of the waterbodies is categorized as below:

a. Marine: All marine waters within Washington State (i.e., Pacific Ocean, Willapa Bay, Grays Harbor, Strait of Juan de Fuca, Strait of Georgia, Puget Sound, Hood Canal, Sammish Bay, Skagit Bay, Totten Inlet, Dabob Bay, Commencement Bay, etc.). Because of the design of the Corps database, it was not possible to separate out tidal areas from minor freshwater creeks, streams, and unnamed tributaries that flow into these waterbodies. However, because the type of activity only occurs in tidally influenced areas, the data should accurately reflect only fish harvesting in marine areas.

b. Columbia River: Mainstem Columbia River within Washington State, including Snake River, Baker Bay, and lakes and reservoirs (i.e. Lake Entiat, Lake Wallula, Franklin D. Roosevelt Lake, Priest Rapids Lake, etc). Data for all tributaries are included under “freshwater” areas. Crab and shrimp harvesting only occur in marine/estuarine reaches of the Columbia River. However, it is not possible to make that distinction within the constraints of the Corps database.

To determine the number of authorized fish and wildlife harvesting activities, all finalized permit actions were queried against the key word “NWP 4” and cross-referenced with the work types “aquatic harvesting device” and “fisheries habitat enhancement.” The cross-referencing ensures that the activity is properly categorized and each NWP 4 verification is only counted once. NWP 4 activities do not require “notification” to the Corps, therefore the data set below represents only those activities where the Corps was notified and a verification was actually issued. The following data also includes before- and, when applicable, after-the-fact authorizations. In 1998, the Corps contacted WDFW to receive a record of all crab harvesting permits issued. Although this does not include shellfish harvesting or shrimp harvesting, the 1998 data is the most accurate data. In comparing the Corps database with one year of data from WDFW (1998), the Corps database outside of 1998 records represent less than 1 % of the actual number of fish and wildlife harvesting activities.

Table 1: Historical Record of Corps Authorization of Shellfish Harvesting

WATERBODY	1995	1996	1997	1998*	1999
Marine	2	1	0	485	0
Columbia River	1	3	0	3	1
TOTAL	3	4	0	488	1

* The data set for the year 1998 includes 486 crab harvesting activities supplied to the Corps by the Washington Department of Fish and Wildlife.

Because no notification is required for NWP 4, the Corps acknowledges that tracking of fish and wildlife harvesting activities has been inconsistent and infrequent. In light of the recent listings under ESA, the Corps proposes to track

these activities as outlined in the “Programmatic Biological Evaluation Notification and Tracking Description”.

9. Environmental Baseline: Refer to Appendix C - Environmental Baseline.

10. Effects of the Action:

a. Direct Effects - Placement of crab or shrimp pots (Non-Commercial and Commercial): Because the effects are relatively the same for all the listed or proposed fish species, the effects analysis does not distinguish between species type. Commercial crabbing and shrimping (both commercial and non-commercial) typically occurs at deeper waters than non-commercial crabbing. For commercial operations, the action area generally encompasses adult migration corridors for listed or proposed fish. For non-commercial operations, the action area is typically in the nearshore and may be in vegetated shallows. These areas are used by juvenile listed or proposed fish for forage and refuge and by forage fish (i.e. Pacific herring) for spawning. Effects to listed or proposed fish species associated with the placement of crab or shrimp in any of the marine/estuarine waters of the U.S. in Washington State except for the mouth of the Columbia River (Baker Bay) are outlined below:

1. Water quality (pot placement): Temporary water quality impacts may occur with the placement of the pots as the pot drops and a small amount of sediment is temporarily suspended in the water column. The pot drops at a speed of 10 feet per second in the water. Pots are placed throughout the day of authorized shrimping or crabbing, regardless of tide levels. The location of the pots is dependent upon the tide in that if the tide is coming in, the harvester wants to make sure there is adequate line to support the buoy and retrieve the pot. Because the pot drops in a matter of seconds and settles, sediment suspension is unlikely to exceed a radius of 25 feet from the pot and would settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. A small amount of resuspension may occur when the pot is retrieved, but this too would settle down to background levels rather quickly. If the pot is placed by hand, wading out to the proposed pot location, resuspension of sediments due to wading in the shallow areas would be similar to the pot placement itself. When installed as described, all temporary water quality impacts associated with the pot placement are insignificant and/or discountable.

2. Water Quality (propwash): The boat placing the buoy is likely to cause some sediment suspension associated with propwash. The boat is stopped or moving extremely slowly during pot placement so the disturbance with the propwash is extremely small. Any turbidity associated with propwash would also settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. For commercial operations, sediment suspension due to propwash is less likely to occur because crabbing and shrimping is in

deeper waters (up to 300 feet). For non-commercial harvesting, propwash is more likely to occur (95% of the time) since harvesting is typically in shallower waters. When installed as described, all temporary water quality impacts are insignificant and/or discountable.

3. Habitat Health: Usually the pots are placed in open areas but there is a potential for the pot to be placed over or adjacent to vegetated shallows since that is prime habitat for crab. When pots are placed in vegetated shallows, the activity is typically non-commercial with smaller boats (a maximum of 25 feet in length) used or pots are placed by hand from a pier or wading out. (This is because the larger vessels used for commercial operations would have difficulty maneuvering in shallow waters and the vegetation may interfere with the boat prop.) When the pots are placed and retrieved, the boat is moving extremely slowly or at a standstill. The pots also remain in the vegetated shallows for a short period of time (approximately 1 day). Operating in this manner, vegetated shallows may be disturbed but destruction is unlikely. When installed as described, impacts to habitat health are insignificant and/or discountable.

b. Direct Effects - Clam Digging and Oyster/Mussel Harvesting

(Non-Commercial): Because the effects are relatively the same for all the listed or proposed fish species, the effects analysis does not distinguish between species type. Effects to listed or proposed fish species associated with non-commercial clam digging in any of the marine/estuarine waters of the U.S. in Washington State except for the mouth of the Columbia River (Baker Bay) are outlined below:

1. Water quality (Turbidity): Oyster and mussel harvesting and clamming occur during low tide on sandy beaches (Kozloff, 1993), when the harvester can access the beach and identify the clam holes or access the rocks the oysters and mussels cling to. For clamming, after the hole is excavated, the harvester refills it with the same material removed. The excavation of the hole and refilling all occurs during the low tide. Since the beach is predominantly sand, any loosened material that may be resuspended when the tide returns, will drop out relatively quickly, matching background levels. For oyster and mussel harvesting, the typical method of prying off the shells will not cause any disturbance to the sediment. However, raking may cause some disturbance as the tide returns and there is a potential for the loosened sediment to resuspend. The rake stirs up sediment at a depth averaging 4 to 6 inches. The beaches are usually a cobble mixed with sand. As with the clamming, the tide may cause resuspension but the sediment drops to background levels rather quickly. When harvesting occurs as described, the impacts to water quality from the clam digging or oyster and mussel harvesting are insignificant and/or discountable.

2. Water quality (propwash): If the clammer or oyster/mussel harvester accesses the beach by boat, propwash from the boat may cause the suspension of sediments in the water column. The boat is stopped or moving extremely slowly

when the clammer or oyster/mussel harvester exits the boat to access the beach, so the disturbance with the propwash is extremely small. Any turbidity associated with propwash would also settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. When access occurs as described, all temporary water quality impacts are insignificant and/or discountable.

3. Habitat Health: The clam hole is refilled with the same material removed before the area is inundated with tidal waters. With the raking method of oyster and/or mussel harvesting on private tidelands, the beach may not be re-raked before the next tidal inundation. However, within one tidal cycle, the substrate will return to its original contours. Foot traffic along the beach and digging for the clams will have insignificant impacts to benthic invertebrates. Raking for non-commercial harvesting may cause some impact to benthic invertebrates but is still at insignificant levels. Harvesting is likely to occur on beaches that are spawning habitat for surf smelt and sand lance, forage species for listed or proposed fish. Surf smelt and sand lance spawn in the upper reaches, between tidal elevations of +7.0 and the mean high-high water line. (WDFW, 1997b) Clams and oysters use the intertidal area between mean high water and mean lower low water (Kozloff, 1993). Impacts to the spawning habitat would only be foot traffic on the beach. Car access to beaches is only allowed on the outer Washington Coast (i.e. Ocean Shores or Long Beach Peninsula). These beaches are not utilized by forage fish for spawning. All the harvesting activity would occur below the area actively used by surf smelt and sand lance for spawning. Disturbance to the spawning habitat is therefore insignificant and/or discountable. Boat activity near or adjacent to vegetated areas has been documented to damage and/or destroy the vegetated areas. (NOAA, 1998) The harvesting will not occur over or adjacent to vegetated shallows so boat traffic, foot traffic and propwash will not be impacting vegetated shallows, essential habitat for forage fish species. With no work in or adjacent to vegetated shallows, the clamming and oyster and mussel harvesting will have insignificant and/or discountable impacts to habitat health.

c. Indirect Effects - Placement of Crab or Shrimp pots (Commercial and Non-Commercial) and Clamming and Oyster and Mussel Harvesting (Non-Commercial): There are no effects resulting from the activity that are later in time.

d. For all other pathways and indicators not specifically mentioned above, the activity will not alter the present environmental baseline.

e. Determination of Effect: Fish and Wildlife Harvesting may affect but are not likely to adversely affect listed fish species and designated critical habitat identified above and will not jeopardize proposed fish species or destroy or adversely modify proposed critical habitat identified above, provided that:

1. In the Columbia River mainstem *including* Snake River and Baker Bay:
 - Work only occurs in tidal portions of the Columbia River (Baker Bay).
 - No clam digging or oyster and mussel harvesting activities occur over or adjacent to vegetated shallows.
2. In the Marine/Estuarine Waters *excluding* Baker Bay:
 - No clam digging or oyster and mussel harvesting activities occur over or adjacent to vegetated shallows.